FEB 08 1993

LINCOLN
APPLIED GEOLOGY, INC.
ENVIRONMENTAL CONSULTANTS

February 5, 1993

Mr. Richard Spiese
Petroleum Sites Management Section
Vermont Department of
Environmental Conservation
103 South Main Street
Waterbury, Vermont 05676

RE: Dann Residence - Preliminary Investigation Results

Dear Mr. Spiese:

In response to your January 5, 1993 letter, Ms. Virginia Dann contracted Lincoln Applied Geology, Inc. (LAG) to initiate a subsurface investigation to determine if a release of fuel oil had occurred at her residence, and if it had, what are the associated impacts. We have had several conversations regarding the investigation since LAG was contracted to perform the work. This letter is written to briefly update you on the preliminary investigation results and inform you of the work we intend to perform to complete the investigation.

Included for your use and review are:

Figure 1, General Location Map,
Figure 2, Detailed Site Map, and
Figure 3, Site Location Tax Map

To date we have performed the following investigatory work:

1. Installation of one vapor monitoring point beneath the storage room floor in the Dann residence basement. The vapor point is located on **Figure 2** as VP-1.

2. Background research into the regional surficial and bedrock geology. The General Location Map is presented as **Figure 1**.

3. Sampling of the Dann residence drinking water well for analysis by EPA Method 602 quantifying benzene, toluene, ethyl benzene, and xylenes. The results sheet for this analysis is enclosed as **Appendix A**.

4. Siting and installation of three 2" ground water monitoring wells utilizing hollow stem auger, washed casing, and rock coring techniques. Lithologic and construction details for these monitoring wells are included in **Appendix B**. The locations of the wells are shown on **Figure 2** as MW-1, MW-2, and MW-3.

5. Collection of a limited amount of ground water elevation and PID data from each of the monitoring points installed. **Table 1** presents ground water elevation data and **Table 2** presents photoionization data.

6. Detailed research of private drinking water supply locations and construction in the general area. Attached as **Figure 3** is a portion of the tax map showing adjacent properties.

Generally, our preliminary data indicates that the suspect 550 gallon underground fuel oil storage tank (UST) currently contains less than six gallons of a fuel oil/sludge mixture, as determined with an interface probe through the fill pipe of the tank. In arriving at this estimate we have assumed that the tank is not significantly tipped out of level. The intake and return lines for a fuel oil storage and heating system are typically installed no closer than 9" to 1'0 to the bottom of a tank. Although we have not actually penetrated the tank to confirm this, we believe that the tank failed and leaked the product that cannot be accounted for.

The 1" diameter vapor point installed through the basement floor in the store room area continues to give positive photoionizable vapors on the order of 10 to 20 parts per million (ppm) as measured by the photoionization detector (PID). All PID data collected from VP-1 is presented in **Table 2**.

A water sample was obtained from the Dann residence well utilizing a clean disposable bailer. This sample was analyzed by Endyne, Inc. for the presence of petroleum related compounds. The results of the analyses are enclosed as **Appendix A** and show non detect levels of EPA 602 compounds.

Three 2" ground water monitoring wells were installed at the locations shown on **Figure 2**. Detailed lithologic and construction logs are included as **Appendix B**. Generally, the site is underlain by a thin veneer of glacial till which overlies highly weathered schist type bedrock and a gray/green competent schist of the Stowe formation. During installation of each of these three wells no positive indications of fuel oil contamination were identified

using olfactory or PID screening techniques. Each of the monitoring wells was properly developed after installation.

The site has been stadia surveyed to determine the relative elevations of the top of well casings and the location of pertinent structures. The survey data was used to develop the Detailed Site Map presented as **Figure 2**. This data will be used to generate general geologic cross sections of the site.

The ambient air within the basement does not currently appear to be impacted although fuel oil odors are evident in the store room area. These odors appear to be related to inadequate venting of the replacement 275 gallon above ground storage tank located within the room. We have verbally recommended to the Dann's that this new above ground storage tank be properly sleeved, plumbed, and vented to the outside. Additionally, we believe that the delivery line from the tank to the fuel oil furnace should be properly installed below the surface of the floor to preclude corrosion.

Generally, the data collected to date provides positive indications of fuel oil vapors beneath the Dann residence. No evidence of significant fuel oil contamination has been detected in any of the monitoring wells installed outside of the Dann residence.

In an effort to more accurately delineate the extent of contamination and implement a remedial action plan which will also serve to further evaluate the relationship between the unconsolidated and bedrock aquifers, we propose to perform the following work:

1. Installation of a hand augered, 2" diameter monitoring well within the confines of the Dann residence. The location of this well will be adjacent to VP-1. The depth of completion of this well will be determined by the ease of hand augering. The placement of this well will enhance our ability to describe the soils and determine the level of contamination beneath the Dann residence. Upon completion the well will be used to perform a vapor extraction test to determine whether significant volumes of contaminated air can be removed from beneath the residence. If the test proves successful, as anticipated, a single vapor extraction remedial system can be readily employed.

2. Further inquiries and interviews will be performed in an effort to obtain detailed accounts of the construction methodologies used in the foundation and UST placement.

3. Chemical ground water quality sampling will be taken from each of the monitoring wells on-site. The Dann drinking water well will also be sampled. These samples will be analyzed by EPA Method 602 for the presence of petroleum related compounds.

4. A transducer type of water level monitoring device will be installed in MW-1 or MW-2 for a period of one week. The continuously recorded data will be utilized to determine if usage of the Dann drinking water well has an effect on the shallow part of the ground water system in the area of the suspect tank and Dann building foundation.

We would like to schedule an on-site meeting with you and the Dann's during the latter part of the week of February 8th to discuss these findings and recommendations. Preferably the meeting could be set for a late afternoon to allow us to perform Task 1.

As you are aware, vapor extraction has worked very well at another nearby residence where a comparable unfortunate incident occurred. We believe that we can be as successful with the Dann residence.

If you have any questions or concerns with regard to this matter, please do not hesitate to call me or John Amadon at 453-4384. We look forward to hearing from you in the near future.

Sincerely,

Steven LaRosa
Geologist

SL/smd
Enclosures
cc: Virginia Dann

Lincoln Applied Geology, Inc.
Environmental Consultants
RD # 1 Box 710 • Bristol, Vermont 05443 • (802) 453-4384 • FAX (802) 453-5399

Table 1

Project: Dann Residence
Location: Stowe, Vermont

Job Number: 9141-277
Sheet 1 of 1

Ground Water Elevation/Product Level (feet)

Data Point	TOC [2]	1-15-93	1-29-93	2-4-93				
MW-1	100.00 [1]	---	80.79	Dry				
MW-2	94.86	---	67.01	65.47				
MW-3	94.41	---	73.78	73.66				
Dann Well	99.81	90.73	92.81	92.50				

NOTES:

1 - Elevation datum assumed

2 - Reference elevation is elevation of top of PVC well casing

Table 2

Project: Dann Residence
Location: Stowe, Vermont

Job Number: 9141-277
Sheet 1 of 1

Photoionization Results (PID - ppm)

Data Point	1-8-93	1-15-93	1-22-93	1-29-93	2-4-93			
MW-1	---	---	---	1.1	2.2			
MW-2	---	---	---	3.4	3.5			
MW-3	---	---	---	10.1	3.1			
Dann Well	---	BG	---	BG	BG			
VP-1	38	4.6	14.8	24	13.0			
Basement	2.0	0.4	BG	0.4	2.9			

NOTES:
BG - Background
SL - Saturated Lamp

APPENDIX A

Water Quality Results

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

GC METHOD--BTEX (BENZENE, TOLUENE, ETHYLBENZENE,XYLENES)

CLIENT: Lincoln Applied Geology
PROJECT NAME: Dann Residence
REPORT DATE: January 20, 1993
DATE SAMPLED: January 15, 1993
DATE RECEIVED: January 15, 1993
ANALYSIS DATE: January 20, 1993

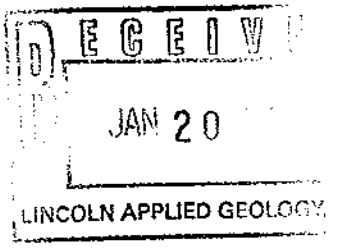
PROJECT CODE: LADR1796
REF.#: 41,179
STATION: Well
TIME SAMPLED: 11:00
SAMPLER: S. LaRosa

Parameter	Detection Limit (ug/L)	Concentration (ug/L)
Benzene	1	ND[1]
Toluene	1	ND
Ethylbenzene	1	ND
Xylenes	1	ND
MTBE	5	ND

Bromobenzene Surrogate Recovery: 72%

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

NOTES:
1 None detected



ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

REPORT OF LABORATORY ANALYSIS

CLIENT: Lincoln Applied Geology
PROJECT NAME: Dann Residence
REPORT DATE: January 20, 1993
DATE SAMPLED: January 15, 1993

PROJECT CODE: LADR1796
REF.#: 41,179

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody.

Chain of custody indicated samples were preserved with HCl.

All samples were prepared and analyzed by requirements outlined in the referenced method and within the specified holding times.

All instrumentation was calibrated with the appropriate frequency and verified by the requirements outlined in the referenced method.

Blank contamination was not observed at levels affecting the analytical results.

Analytical method precision and accuracy was monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits.

Reviewed by,

Harry B. Locker, Ph.D.
Laboratory Director

enclosures

APPENDIX B

Well Logs

WELL LOG

WELL: MW-1

LOCATION: Dann Residence, Stowe, Vermont

DRILLER: Tri-State Drilling and Boring

GEOLOGIST: Steven LaRosa, Lincoln Applied Geology, Inc.

DATE: January 20, 1993

Soils Description

BG = Background

Depth	Description	HNU (ppm)
0 - 12.0'	Dry, light brown, very fine sandy till. Significant amount of schistosic minerals. Some peds of clay and pebbly till.	BG
12.0 - 22.0'	Gray, green, highly weathered schist of the Stowe formation. Rock core from 17.0 - 22.0' reveals vuggy steeply dipping schist containing numerous replacement minerals. Extremely weathered in the 18.0 - 20.0' zone. 21.0 to 22.0 feet appeared slightly more competent. No visual evidence of water bearing vugs or fractures.	

Well Construction

Bottom of Boring:	22.0'
Well Screen:	5.0' of 0.010 slot, 2" sch. 40 PVC
Solid Riser:	17.0' of solid 2" sch. 40 PVC
Sand Pack:	22.0' - 16.5'
Bentonite Seal:	16.5' - 2.5'

WELL LOG

WELL: MW-2

LOCATION: Dann Residence, Stowe, Vermont

DRILLER: Tri-State Drilling and Boring

GEOLOGIST: Steven LaRosa, Lincoln Applied Geology, Inc.

DATE: January 21, 1993

Soils Description BG = Background

Depth	Description	HNU (ppm)
0 - 16.0'	Hard, dry olive brown till with many pebbles and schistosic minerals.	BG
16.0 - 30.0'	Dry, light brown highly weathered schist. Some greener and blacker lenses at 25.0' - 26.0'.	BG
30.0 - 32.0'	Gray, green, competent schist with few replacement minerals. Appears water bearing at the 30.5' to 31.0' area.	

Well Construction

Bottom of Boring:	32.0'
Well Screen:	10.0' of 0.010 slot, 2" sch. 40 PVC
Solid Riser:	12.0' of solid 2" sch. 40 PVC
Sand Pack:	32.0' - 20.5'
Bentonite Seal:	20.5' - 1.0'

WELL LOG

WELL: MW-3

LOCATION: Dann Residence, Stowe, Vermont

DRILLER: Tri-State Drilling and Boring

GEOLOGIST: Steven LaRosa, Lincoln Applied Geology, Inc.

DATE: January 22, 1993

Soils Description

BG = Background

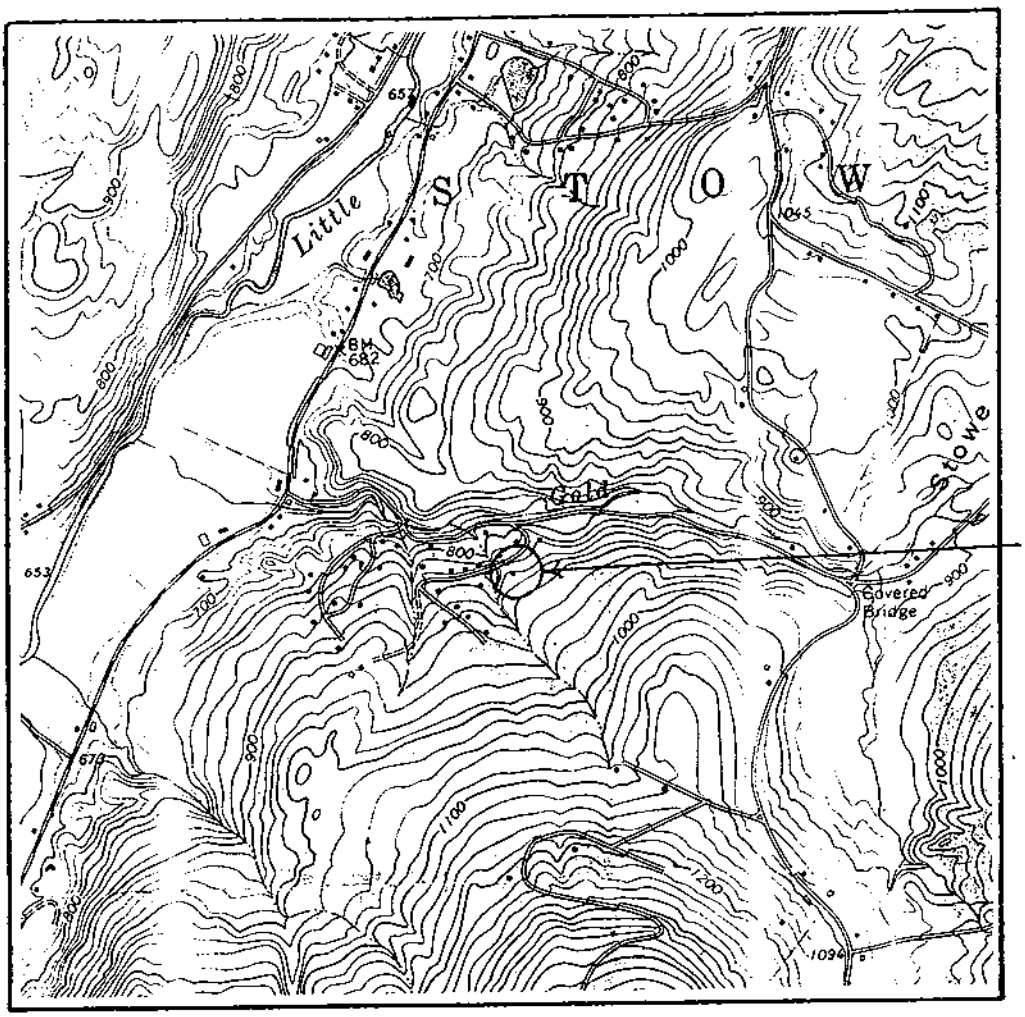
Depth	Description	HNU (ppm)
0 - 27.0'	Dry, hard light brown till, containing significant amounts of schist type minerals. Some gravels encountered at 10.0'. Red brown coloring and more schist fragments seen from 17.0' through 27.0'. Saturated at 22.0'.	BG

Well Construction

Bottom of Boring:	25.0'
Well Screen:	10.0' of 0.010 slot, 2" sch. 40 PVC
Solid Riser:	15.0' of solid 2" sch. 40 PVC
Sand Pack:	25.0' - 12.0'
Bentonite Seal:	12.0' - 1.0'

Dann Residence
Stowe, Vermont
Petroleum Contamination

GENERAL LOCATION MAP



Source: U.S.G.S. 7.5 min. Topo Series
Stowe Quad

Scale: 1" = 2000'

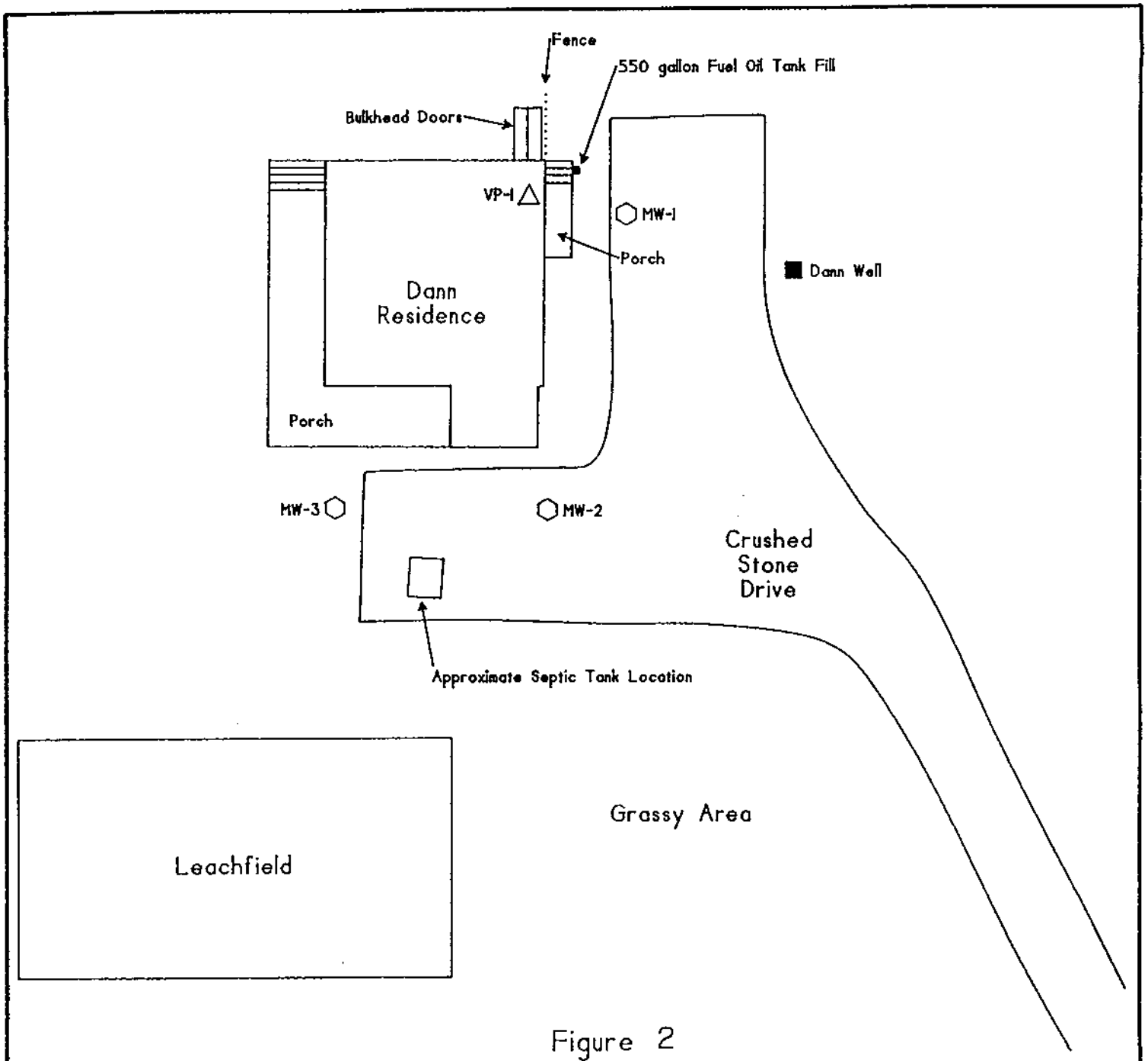


Figure 2

LEGEND

- 2" Monitoring Well
- 1" Vapor Point
- 6" Drinking Water Well

North

LINCOLN APPLIED GEOLOGY, INC. ENVIRONMENTAL CONSULTANTS

Dann Residence

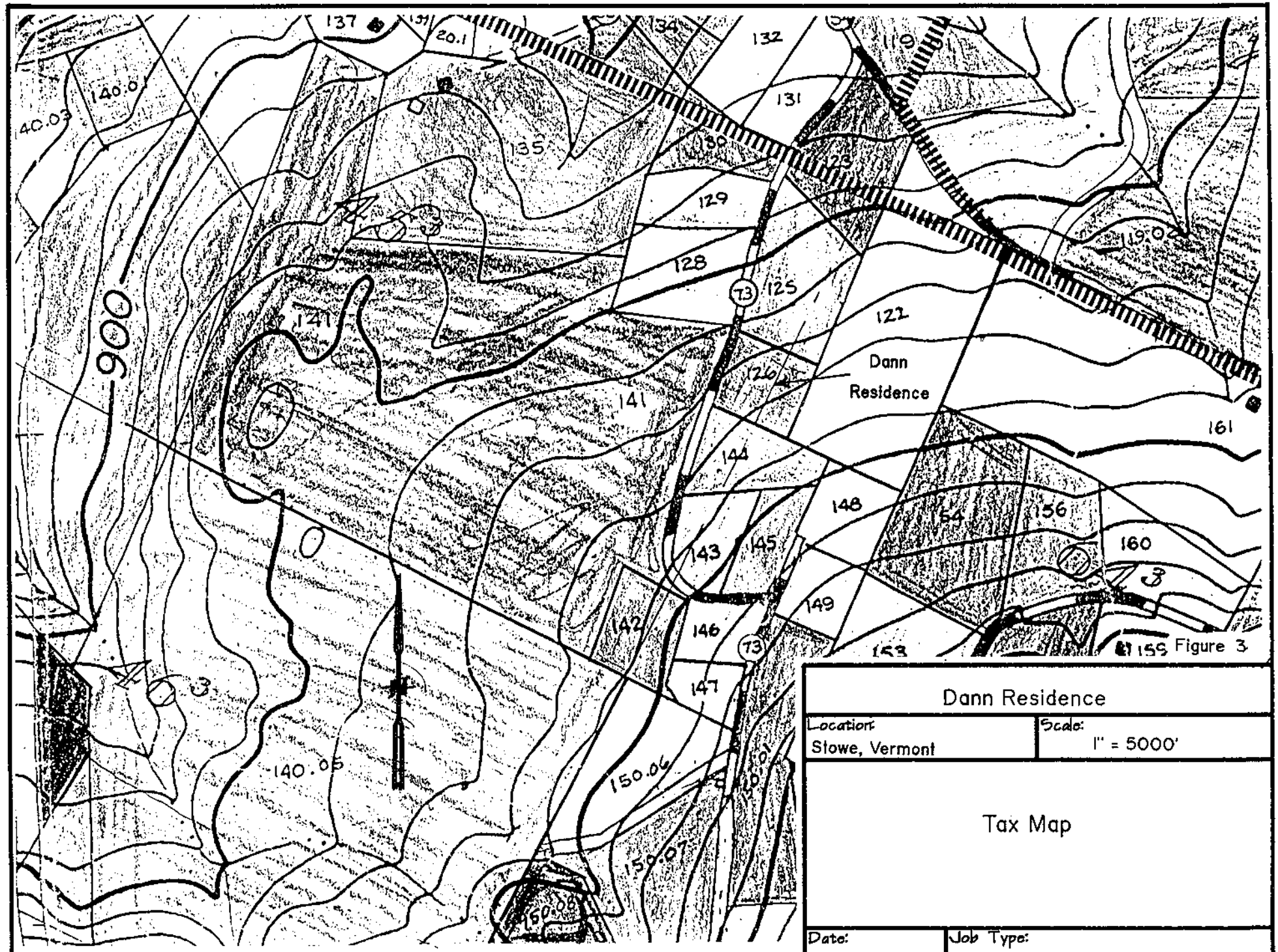
Location: Stowe, Vermont

Scale: 1" = 20'

Detailed Site Map

Date: Feb 93

Job Type: Petroleum Contamination



Dann Residence	
Location: Stowe, Vermont	Scale: 1" = 5000'
Tax Map	
Date: Jan 1993	Job Type: Fuel Oil Contamination